

Application Number 10/813,307
Amendment dated May 7, 2007
Responsive to Office Action mailed February 8, 2007

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AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions and listings of claims in the application.

Listing of Claims:

Claim 1 (Currently Amended): ~~A medical device for placement within a body lumen of a patient, the device comprising:~~

a device housing sized for introduction into and residence completely within the body lumen;

a fixation mechanism to attach the device housing to a surface within the body lumen; and

a controlled detachment mechanism mechanically actuated to selectively detach the device housing from the surface of the body lumen, wherein the medical device remains completely within the body lumen until after the device is detached from the surface.

Claim 2 (Original): The medical device of claim 1, wherein the fixation mechanism includes a cavity formed in the device housing and a shaft to capture luminal tissue within the cavity.

Claim 3 (Original): The medical device of claim 2, wherein the cavity includes a vacuum port for application of vacuum pressure to draw the tissue into the cavity.

Claim 4 (Original): The medical device of claim 2, wherein the fixation mechanism includes a spring to bias the shaft toward the tissue, and the detachment mechanism includes a solenoid coil wound about the shaft and a circuit to energize the solenoid coil to drive the shaft against the spring bias and thereby release the luminal tissue.

Claim 5 (Original): The medical device of claim 4, wherein the circuit is responsive to a control signal to energize the solenoid coil.

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Claim 6 (Withdrawn): The medical device of claim 2, wherein the fixation mechanism includes a detent to abut a first end of the shaft and thereby maintain a position of a second end of the shaft relative to the tissue, and the detachment mechanism includes means for releasing the detent from the first end, and a spring to bias the shaft away from the tissue and thereby release the tissue.

Claim 7 (Withdrawn): The medical device of claim 6, wherein the releasing means includes a piezoelectric element and a circuit to energize the piezoelectric element to disengage the detent.

Claim 8 (Withdrawn): The medical device of claim 7, wherein the circuit is responsive to a control signal to energize the piezoelectric element.

Claim 9 (Withdrawn): The medical device of claim 2, wherein the detachment mechanism includes a fuse link in the shaft, and a circuit to apply current to blow the fuse link and thereby disengage a first portion of the shaft from a second portion of the shaft to release the luminal tissue.

Claim 10 (Withdrawn): The medical device of claim 9, wherein the circuit is responsive to a control signal to apply the current to blow the fuse link.

Claim 11 (Withdrawn): The medical device of claim 1, wherein the fixation mechanism includes a bonding agent, and the detachment mechanism includes a property of the bonding agent that permits rapid degradation of the bonding agent upon introduction of a degradation agent into the body lumen.

Claim 12 (Withdrawn): The medical device of claim 11, wherein the bonding agent includes a biologically mediated bonding agent.

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Claim 13 (Withdrawn): The medical device of claim 11, wherein the bonding agent includes a clotting agent, and the degradation agent includes an anti-clotting agent.

Claim 14 (Withdrawn): The medical device of claim 11, wherein the bonding agent includes a fibrin glue, and the degradation agent includes streptokinase.

Claim 15 (Withdrawn): The medical device of claim 11, wherein the bonding agent includes a polymeric adhesive, and the degradation agent includes a depolymerization agent.

Claim 16 (Withdrawn): The medical device of claim 1, wherein the shaft includes a sharpened end to penetrate the tissue.

Claim 17 (Original): The medical device of claim 1, further comprising a power source to power the detachment mechanism.

Claim 18 (Previously Presented): The medical device of claim 17, wherein the power source includes a battery.

Claim 19 (Previously Presented): The medical device of claim 17, wherein the power source includes an inductive coupling circuit to generate power from an inductive element external to the body lumen.

Claim 20 (Previously Presented): The medical device of claim 1, further comprising a controller responsive to a control signal to activate the detachment mechanism.

Claim 21 (Previously Presented): The medical device of claim 20, wherein the controller includes a telemetry circuit to receive the control signal as a telemetry signal from an external controller.

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Claim 22 (Previously Presented): The medical device of claim 20, wherein the controller includes an inductive coupling circuit to sense the presence of an external inductive element as the control signal.

Claim 23 (Previously Presented): The medical device of claim 20, wherein the controller includes an inductive coupling circuit to generate power from an inductive element external to the body lumen and thereby drive the detachment mechanism with the generated power.

Claim 24 (Original): The medical device of claim 1, wherein the device housing is sized for introduction into the esophagus.

Claim 25 (Original): The medical device of claim 1, wherein the device housing is sized for passage through the gastrointestinal tract.

Claim 26 (Original): The medical device of claim 1, further comprising a sensor, mounted to the device housing, to sense at least one condition within the body lumen.

Claim 27 (Original): The medical device of claim 1, further comprising a sensor, mounted to the device housing, to sense at least one of pH, flow, temperature, and pressure within the body lumen.

Claim 28 (Original): The medical device of claim 1, further comprising:
an electrical pulse generator, mounted within the device housing, to generate an electrical stimulation waveform;
one or more electrodes electrically coupled to the electrical pulse generator and mounted to the device housing to deliver the electrical stimulation waveform to the body lumen.

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Claim 29 (Currently Amended): A method for attaching and detaching a medical device within a body lumen of a patient, the method comprising:

positioning the medical device at a target location within the body lumen;

activating a fixation mechanism carried by the medical device to attach the medical device to a surface within the body lumen, wherein the medical device is sized for residence completely within the body lumen; and

activating a controlled mechanically actuated detachment mechanism carried by the medical device to detach the medical device from the surface of the body lumen.

Claim 30 (Original): The method of claim 29, wherein the fixation mechanism includes a cavity formed in the device housing and a shaft to capture luminal tissue within the cavity, and activating the fixation mechanism includes advancing the shaft to capture the tissue.

Claim 31 (Original): The method of claim 30, wherein the cavity includes a vacuum port for application of vacuum pressure to draw the tissue into the cavity, and activating a fixation mechanism includes applying vacuum pressure to the vacuum port.

Claim 32 (Original): The method of claim 30, wherein the fixation mechanism includes a spring to bias the shaft toward the tissue, and the detachment mechanism includes a solenoid coil wound about the shaft, and activating the detachment mechanism includes energizing the solenoid coil to drive the shaft against the spring bias and thereby release the luminal tissue.

Claim 33 (Withdrawn): The method of claim 30, wherein the fixation mechanism includes a detent to abut a first end of the shaft and thereby maintain a position of a second end of the shaft relative to the tissue, the method further comprising releasing the detent from the first end of the shaft, and biasing the shaft away from the tissue to thereby release the tissue.

Claim 34 (Withdrawn): The medical device of claim 33, wherein the releasing means includes a piezoelectric element and a circuit to energize the piezoelectric element to disengage the detent.

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Claim 35 (Withdrawn): The method of claim 29, wherein the detachment mechanism includes a fuse link in the shaft, and activating the detachment mechanism includes applying current to blow the fuse link and thereby disengage a first portion of the shaft from a second portion of the shaft to release the luminal tissue.

Claim 36 (Withdrawn): The method of claim 29, wherein the fixation mechanism includes a bonding agent, and the detachment mechanism includes a property of the bonding agent that permits rapid degradation of the bonding agent in the presence of a degradation agent, wherein activating the detachment mechanism includes introducing the degradation agent into the body lumen to rapidly degrade the bonding agent.

Claim 37 (Withdrawn): The method of claim 36, wherein the bonding agent includes a biologically mediated bonding agent.

Claim 38 (Withdrawn): The method of claim 36, wherein the bonding agent includes a clotting agent, and the degradation agent includes an anti-clotting agent.

Claim 39 (Withdrawn): The method of claim 36, wherein the bonding agent includes a fibrin glue, and the degradation agent includes streptokinase.

Claim 40 (Withdrawn): The method of claim 36, wherein the bonding agent includes a polymeric adhesive, and the degradation agent includes a depolymerization agent.

Claim 41 (Original): The method of claim 29, further comprising powering the detachment mechanism with a battery carried by the medical device.

Claim 42 (Original): The method of claim 29, further comprising powering the detachment mechanism with power generated by an inductive coupling circuit carried by the medical device in response to inductive energy generated by an inductive element external to the body lumen.

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Claim 43 (Original): The method of claim 29, further comprising activating the detachment mechanism in response to receipt of a control signal from a controller external to the body lumen.

Claim 44 (Original): The method of claim 29, further comprising activating the detachment mechanism in response to presence of an external magnetic source.

Claim 45 (Original): The method of claim 29, further comprising positioning the medical device within the esophagus of the patient.

Claim 46 (Original): The method of claim 29, further comprising sensing at least one of pH, flow, temperature, and pressure within the body lumen with a sensor carried by the medical device.

Claim 47 (Original): The method of claim 29, further comprising:
generating an electrical stimulation waveform; and
delivering the electrical stimulation waveform to the tissue via one or more electrodes carried by the medical device.

Claim 48 (Withdrawn): A medical device for placement within a body lumen of a patient, the device comprising:
a device housing sized for introduction into the body lumen;
means for attaching the device housing to a surface within the body lumen; and
means for detaching the device housing from the surface of the body lumen in response to a control signal, wherein the attaching and detaching means are carried by the device housing.

Claim 49 (Withdrawn): The medical device of claim 48, wherein the attaching means includes a cavity formed in the device housing and means for capturing luminal tissue within the cavity.

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Claim 50 (Withdrawn): The medical device of claim 48, wherein the attaching means includes a bonding agent, and the detaching means includes a property of the bonding agent that permits rapid degradation of the bonding agent in the presence of a degradation agent introduced into the body lumen.

Claim 51 (Withdrawn): The medical device of claim 50, wherein the bonding agent includes a biologically mediated bonding agent.

Claim 52 (Withdrawn): The medical device of claim 50, wherein the bonding agent includes a clotting agent, and the degradation agent includes an anti-clotting agent.

Claim 53 (Withdrawn): The medical device of claim 50, wherein the bonding agent includes a fibrin glue, and the degradation agent includes streptokinase.

Claim 54 (Withdrawn): The medical device of claim 50, wherein the bonding agent includes a polymeric adhesive, and the degradation agent includes a depolymerization agent.

Claim 55 (Withdrawn): The medical device of claim 48, further comprising means for sensing at least one of pH, flow, temperature, and pressure within the body lumen.

Claim 56 (Withdrawn): The medical device of claim 48, further comprising:
means for generating an electrical stimulation waveform; and
means for delivering the electrical stimulation waveform to the tissue.

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Claim 57 (Withdrawn): A medical device for placement within a body lumen of a patient, the device comprising:

a device housing sized for introduction into the body lumen;

a fixation mechanism to attach the device housing to a surface within the body lumen, wherein the fixation mechanism includes a cavity formed in the device housing, the cavity including a vacuum port for application of vacuum pressure to draw luminal tissue into the cavity, and a shaft to capture the luminal tissue within the cavity; and

a detachment mechanism to detach the device housing from the surface of the body lumen in response to a control signal, wherein the detachment mechanism includes an actuator to release the shaft from the tissue.

Claim 58 (Withdrawn): The medical device of claim 57, wherein the actuator includes a solenoid coil.

Claim 59 (Withdrawn): The medical device of claim 57, wherein the actuator includes a spring.

Claim 60 (Withdrawn): The medical device of claim 57, wherein the actuator includes a piezoelectric element.

Claim 61 (Withdrawn): The medical device of claim 57, wherein the shaft penetrates the tissue.

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Claim 62 (Withdrawn): A medical device for placement within a body lumen of a patient, the device comprising:
a device housing sized for introduction into the body lumen;
a fixation mechanism to attach the device housing to a surface within the body lumen, wherein the fixation mechanism includes bonding agent; and
a detachment mechanism to detach the device housing from the surface of the body lumen in response to a control signal, wherein the detachment mechanism includes a degradation agent to rapidly degrade the bonding agent.

Claim 63 (Withdrawn): The medical device of claim 62, wherein the bonding agent includes a biologically mediated bonding agent.

Claim 64 (Withdrawn): The medical device of claim 62, wherein the bonding agent includes a clotting agent, and the degradation agent includes an anti-clotting agent.

Claim 65 (Withdrawn): The medical device of claim 62, wherein the bonding agent includes a fibrin glue, and the degradation agent includes streptokinase.

Claim 66 (Withdrawn): The medical device of claim 62, wherein the bonding agent includes a polymeric adhesive, and the degradation agent includes a depolymerization agent.

Claim 67 (New): A medical device comprising:
a device housing sized for introduction into and residence completely within the body lumen;
a fixation mechanism to attach the device housing to a surface within the body lumen, wherein the fixation mechanism includes a spring to bias the shaft toward the tissue; and
a controlled detachment mechanism to selectively detach the device housing from the surface of the body lumen, wherein the detachment mechanism includes a solenoid coil wound about the shaft and a circuit to energize the solenoid coil to drive the shaft against the spring bias and thereby release the luminal tissue.

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Claim 68 (New): The medical device of claim 67, wherein the circuit is responsive to a control signal to energize the solenoid coil.